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Original Research Article

PREVALENCE OF DENTAL CARIES AMONG SMOKERS OF A TERTIARY CARE HOSPITAL OF LAHORE

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Abstract: *Dental caries is a common chronic oral health condition globally, with an increased prevalence among smokers. Smoking contributes to caries risk by affecting saliva production, oral microbiota, and oral hygiene practices. In Pakistan, where smoking is prevalent* ***Objective:*** *This study aims to assess the prevalence of dental caries among smokers attending a tertiary care hospital in Lahore.* ***Methods:*** *A cross-sectional study was conducted at Jinnah Hospital, Lahore, from January to July 2024. The sample included 100 adult smokers aged 18 years and above. Data on demographics, smoking frequency, oral hygiene practices, and dental caries were collected using structured interviews and clinical examinations. Caries severity was assessed using the Decayed, Missing, and Filled Teeth (DMFT) index. Statistical analyses, including chi-square tests, were conducted to explore associations between smoking habits and caries prevalence.* ***Results:*** *The majority of participants were aged 26-35 (30%), with 35% smoking 6-10 cigarettes daily. Oral hygiene practices were suboptimal, with only 25% brushing twice daily, and 15% reporting no regular hygiene routine. The prevalence of dental caries was strongly correlated with smoking frequency and duration. Participants smoking more than 21 cigarettes daily had an 80% caries prevalence, while those with a smoking history of over 16 years had a mean DMFT score of 7.6. These results align with previous studies linking smoking with higher caries risk and severity.* ***Conclusion:*** *The study highlights a high prevalence of dental caries among smokers, with significant associations between smoking frequency, duration, and caries severity. These findings underscore the need for preventive dental health interventions, including smoking cessation programs and targeted oral hygiene education, to mitigate the burden of dental caries in this high-risk population.*

Keywords: Dental Caries, Smoking, DMFT Index, Oral Health, Prevalence, Pakistan

Introduction

Dental caries, one of the most prevalent chronic oral health conditions globally, is a significant public health concern, particularly in developing countries like Pakistan. Smoking, a well-established risk factor for various oral health issues, is closely associated with an increased prevalence of dental caries due to its impact on saliva production, oral microbiome, and overall oral hygiene practices (1). In Pakistan, where tobacco usage is widespread among adults, the burden of dental caries among smokers has emerged as an area of interest for researchers and healthcare providers aiming to mitigate oral health issues associated with lifestyle factors (2).

The relationship between smoking and dental caries is complex and multifactorial, influenced by factors such as socioeconomic status, dietary habits, and the accessibility of preventive dental services. Smoking reduces the production of saliva, an essential factor for the natural remineralization process and cleansing of the oral cavity, thereby creating a favourable environment for cariogenic bacteria to thrive (3). In Pakistan, awareness and accessibility to preventive oral health care are often limited, particularly in tertiary care settings where individuals seek care mainly for acute dental issues rather than for preventive treatments (4).

Recent studies highlight that smokers not only show higher caries prevalence but also present with more severe forms of caries, often necessitating advanced dental interventions (5). The harmful compounds in tobacco smoke, such as nicotine and tar, contribute to the demineralization of tooth enamel, thereby increasing susceptibility to dental caries (6). Additionally, behavioural aspects linked to smoking, including poor oral hygiene practices, further exacerbate the risk of caries (7).

Given the rising prevalence of smoking and its impact on oral health, there is a growing need to examine the prevalence and severity of dental caries among smokers in Pakistan. By focusing on the population visiting a tertiary care hospital in Lahore, this study aims to contribute valuable data to the limited body of literature on dental caries among smokers in Pakistan. The findings could inform targeted preventive measures and policies aimed at reducing the oral health burden in this high-risk group.

Methodology

Study Design and Setting This cross-sectional study was conducted at Jinnah Hospital, a tertiary care hospital in Lahore, Pakistan, from January 2024 to July 2024. This facility serves a diverse population, providing an ideal setting to examine the prevalence of dental caries among smokers.

The study targeted adult smokers aged 18 years and above who visited the dental department of Jinnah Hospital for routine or emergency dental care. A sample size of 100 participants was determined to ensure a representative analysis of dental caries prevalence within this population. Inclusion criteria encompassed individuals who (1) were current smokers (smoking at least one cigarette daily for the past six months), (2) provided informed consent, and (3) had

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at least one natural tooth. Exclusion criteria included individuals with (1) systemic diseases impacting oral health (e.g., diabetes, immunocompromised status), (2) use of orthodontic appliances, and (3) recent use of antibiotics or antiseptic mouth rinses within the past three months, as these could influence oral microbiota and caries formation.

Data collection involved a structured, interviewer-administered questionnaire and a clinical oral examination. The questionnaire collected demographic information, smoking history (frequency, duration), oral hygiene practices, and dietary habits. A clinical examination was performed by a trained dentist using the Decayed, Missing, and Filled Teeth (DMFT) index to assess caries status. All examinations followed international caries diagnostic standards and were conducted in a well-lit clinical setting with sterile equipment.

Data were entered and analyzed using SPSS (version 26.0). Descriptive statistics, including mean, standard deviation, and frequency distributions, were calculated for demographic variables and smoking patterns. The prevalence of dental caries was computed as a proportion of the sample with DMFT scores indicating decay. Chi-square tests were employed to examine associations between caries prevalence and variables such as smoking frequency, duration, and oral hygiene practices. Statistical significance was set at $p < 0.05$.

Ethical approval for this study was obtained from the Institutional Review Board (IRB) of Jinnah Hospital, Lahore. Informed consent was obtained from all participants before enrollment, and participants were assured of the confidentiality of their data. Those diagnosed with untreated caries were advised to seek dental treatment, and preventive oral health information was provided to all participants.

Results

Table 1 shows the age distribution of the study participants. The majority of participants were in the 26-35 age group (30%), followed by the 36-45 age group (25%). This demographic representation highlights the age groups most likely to visit the dental department for issues related to smoking and dental caries.

Table 2 outlines the smoking frequency among participants. The most common smoking range was 6-10 cigarettes per day (35%), followed by 11-20 cigarettes per day (30%). These figures help categorize participants based on their daily smoking habits, a critical factor when examining caries prevalence.

Table 3 presents the distribution of oral hygiene practices among participants. A notable 40% of participants reported brushing once daily, while 25% brushed twice daily, and 20% used mouthwash. The 15% with no regular hygiene practice represent a high-risk group for dental caries due to insufficient oral hygiene routines.

Table 4 classifies participants by DMFT (Decayed, Missing, and Filled Teeth) scores, representing the severity of dental caries. The largest group falls into the "Moderate" category (4-6 DMFT score), accounting for 40% of participants, while 20% had high DMFT scores (7+), suggesting advanced caries in a significant portion of the sample.

Table 5 shows the relationship between smoking frequency and caries prevalence. As smoking frequency increases, caries prevalence rises, with participants smoking more than 21 cigarettes daily showing the highest caries prevalence at 80%. This highlights a dose-response relationship between smoking frequency and dental caries severity.

Table 6 examines the association between smoking duration and the mean DMFT score. The results suggest a positive correlation, with longer smoking durations associated with higher mean DMFT scores, indicating a cumulative effect of smoking on dental health over time. Participants with over 16 years of smoking had the highest mean DMFT score at 7.6, suggesting substantial dental deterioration in long-term smokers.

Table 1: Demographic Distribution of Participants

Age Group	Frequency (%)
18-25	15
26-35	30
36-45	25
46-55	20
56+	10

Table 2: Smoking History of Participants

Smoking Frequency (Cigarettes/Day)	Percentage (%)
1-5	20
6-10	35
11-20	30
21+	15

Table 3: Oral Hygiene Practices among Participants

Oral Hygiene Practice	Frequency (%)
Brushes Once Daily	40
Brushes Twice Daily	25
Uses Mouthwash	20
No Regular Practice	15

Table 4: Caries Prevalence by DMFT Score

DMFT Category	Frequency (%)
0 (No Caries)	10
1-3 (Low)	30
4-6 (Moderate)	40
7+ (High)	20

Table 5: Caries Prevalence by Smoking Frequency

Smoking Frequency (Cigarettes/Day)	Caries Prevalence (%)
1-5	20
6-10	40
11-20	60
21+	80

Table 6: Associations between Smoking Duration and Mean DMFT Scores

Smoking Duration (Years)	Mean DMFT Score
<5	1.5
5-10	3.8
11-15	5.2
16+	7.6

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Discussion

The current study investigated the prevalence of dental caries among smokers in a tertiary care hospital in Lahore, highlighting significant associations between smoking frequency, oral hygiene practices, and caries severity. These findings emphasize the multifaceted impact of smoking on oral health, especially in resource-limited settings like Pakistan, where awareness and access to preventive dental care are limited.

Our study revealed that most smokers in our sample had moderate to high DMFT scores, with 40% falling into the "moderate" category (4-6 DMFT) and 20% into the "high" category (7+ DMFT). These results align with similar studies, such as (8). Who reported elevated DMFT scores in smokers due to factors like increased bacterial colonization and decreased salivary flow. Furthermore, this study found that smoking frequency significantly impacts caries prevalence. For instance, participants smoking more than 21 cigarettes daily had a caries prevalence of 80%, compared to 20% among those smoking 1-5 cigarettes. These results corroborate (13). Who also found a dose-response relationship, where higher cigarette consumption led to increased caries prevalence?

Oral hygiene practices played a critical role in our study, with only 25% of participants reporting brushing twice daily, while 15% admitted to no regular oral hygiene practices. This pattern is consistent with findings from (9). Who noted a higher incidence of dental caries among smokers with poor oral hygiene? The relationship between poor hygiene practices and caries among smokers may be explained by the additive effect of smoking on oral bacterial growth, which exacerbates the risk of caries development (10).

A notable observation was the association between smoking duration and DMFT scores. Our findings indicate that participants who smoked for more than 16 years had a mean DMFT score of 7.6, suggesting cumulative damage from prolonged exposure to tobacco compounds. This observation aligns with (11). Who reported a similar trend, indicating that long-term smoking progressively damages tooth enamel and oral soft tissues, leading to higher caries risk.

Our findings align with both regional and international studies on the impact of smoking on dental health. Studies globally have observed a consistent pattern where higher smoking frequency and longer duration correlate with increased caries risk (14). Our results mirror these findings, reinforcing the importance of smoking cessation efforts, particularly in dental care settings. While regional studies, like those by (12). Reported slightly lower DMFT scores, possibly due to varying cultural and dietary factors, the overarching trend remains similar. This consistency in findings across different settings underscores the need for targeted oral health interventions for smokers.

Our study contributes to the limited body of literature on dental caries among smokers in Pakistan, highlighting the urgent need for preventive programs. The findings support the incorporation of smoking cessation and oral health awareness in routine dental practice, which may help reduce the caries burden in smoker populations. Additionally, our study emphasizes the need for regular dental check-ups and oral hygiene education for smokers, aligning with recommendations from Ali and Memon (2023), who advocate for structured dental health interventions for high-risk groups.

Conclusion

The study highlights a high prevalence of dental caries among smokers, with significant associations between smoking frequency, duration, and caries severity. These findings underscore the need for preventive dental health interventions, including smoking cessation programs and targeted oral hygiene education, to mitigate the burden of dental caries in this high-risk population.

Declarations

Data Availability statement
All data generated or analyzed during the study are included in the manuscript.

Ethics approval and consent to participate
Approved by the department concerned. (IRBEC-SNU-011/23)

Consent for publication
Approved

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Not applicable

Conflict of interest

The authors declared the absence of a conflict of interest.

Author Contribution

HAFSA ZULFIQAR (Student)
Coordination of collaborative efforts.
Study Design, Review of Literature.
MEMOON FATIMA (Student)
Conception of Study, Development of Research Methodology Design, Study Design, Review of manuscript, final approval of manuscript.
Conception of Study, Final approval of manuscript.
HUMAIRA SADDIQUE (Assistant Professor)
Manuscript revisions, critical input.
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